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AN EFFICIENT IMAGE MATCHING TECHNIQUE IN MATLAB

Prof. Vikram Mahendra Kakade

Assistant Professor, Electronics & Telecommunication Engineering Department, Prof Ram Meghe College of Engineering & Management, Badnera-Amravati, Maharashtra India-444702.

ABSTRACT

The deployment of large image databases for a variety of applications have now become realizable. Databases of art works, satellite and medical imagery have been attracting more and more users in various professional fields — for example, geography, medicine, architecture, advertising, design, fashion, and publishing. In this paper my approach is used to present best method in terms of efficiency and comparative analysis over various method where work has been carried until now the retrieval of images based on visual features such as colour, texture and shape Reasons for its development . In many large image databases, traditional methods of image indexing have proven to be insufficient, laborious, and extremely time consuming. These old methods of image indexing, ranging from storing an image in the database and associating it with a keyword or number, to associating it with a categorized description, have become obsolete.

KEYWORDS: CBIR, Color, Feature, Image, Mapping.

1. Introduction

Image matching is an important task to be performed for the correspondence problem. The distinction between different matching primitives is probably the most prominent difference between the various matching algorithms. Digital image matching automatically establishes the correspondence between primitives extracted from two or more digital images depicting at least partly the same scene. With the help of the transformation parameters achieved at low resolution level, we can apply block wise SIFT extraction and matching to improve the efficiency. In general, the detection of points and subsequent extraction of their features for matching them is one of the most common applied methods. Some of the representation images for matching based on CBIR are as follows

Methods of Representation

The main method of representing color information of images in CBIR systems is through color histograms. A color histogram is a type of bar graph, where each bar represents a particular color of the color space being used. In MATLAB for example you can get a color histogram of an image in the RGB or HSV color space. The bars in a color histogram are referred to as bins and they represent the x-axis. The number of bins depends on the number of colors there are in an image. The y-axis denotes the number of pixels there are in each bin. In other words how many pixels in an image are of a particular color. An example of a color histogram in the HSV color space can be seen with the following image:

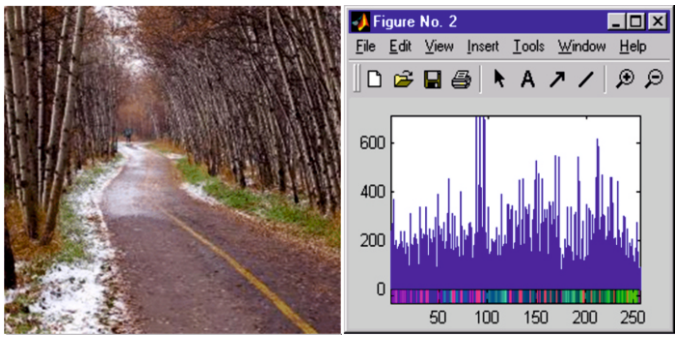

Figure 1.1 Sample Image and its Corresponding Histogram

To view a histogram numerically one has to look at the color map or the numeric representation of each bin.

2. Phase of Image Matching

Following block diagram is pictorial representation of phases of image matching technique can be carried out in step by step manner with respect to following diagram

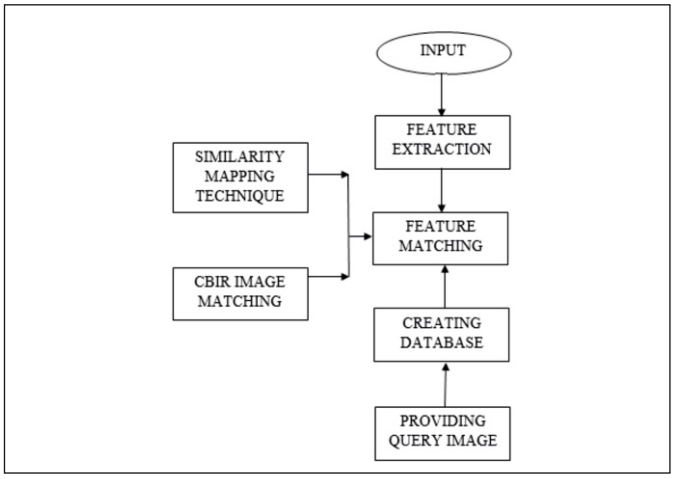

Figure 2.1 Phases of shape retrieval approach

3. Flowchart and Working

Considering the methodology used in retrieval process that will used to retrieve shapes with geometric distortion for various input shapes, the flow chart can be drawn specifying working of project as below:

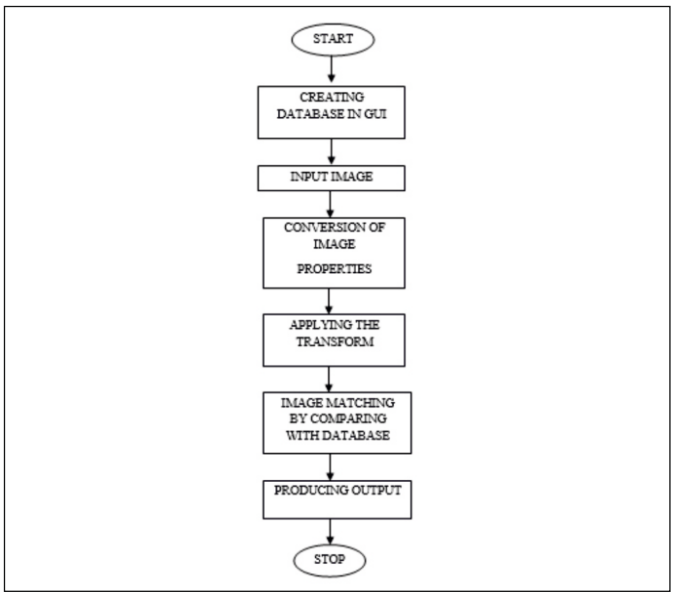

Figure 3.1 Flowchart of System

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4. Result

The first part of the project is the selection of database images for various shape retrieval with geometric distortions for testing. Few images were referenced from Alphabet Databases from American Sign Language Database (ASL) and others were real time photographed either through MATLAB or digitized or 3D Hand Models. A total of 300 different images were used for database.

Both Database and input images were carried through same similar procedures. Images were first smoothened to remove noise and irregularities either by using a median filter or by using a Gaussian mask. They were then converted for recognition or retrievals purposes. Some images had uniform background than the ones taken from real-time camera. Hence a threshold deciding function was used to extract the required portion of the interested image. These procedures were carried out for various different postures. For example, Figure 4.1, the left column (a) and (c) shows the database images and the right

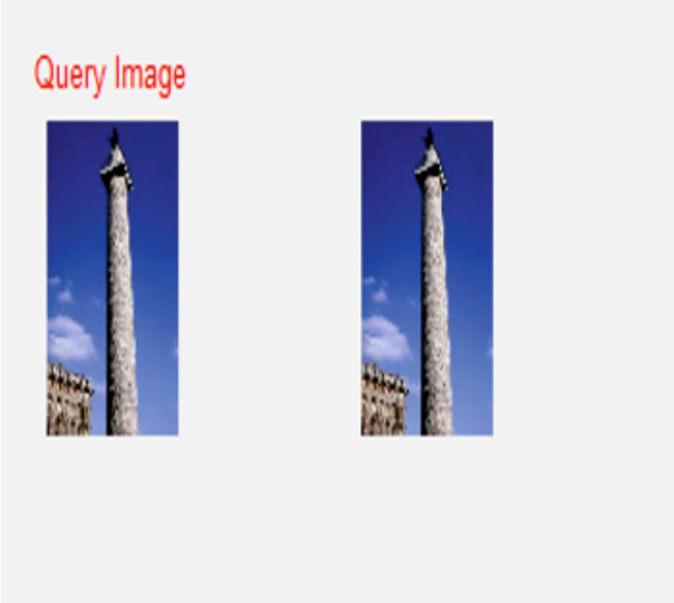

Figure 4.1 Observed Result in Image Matching

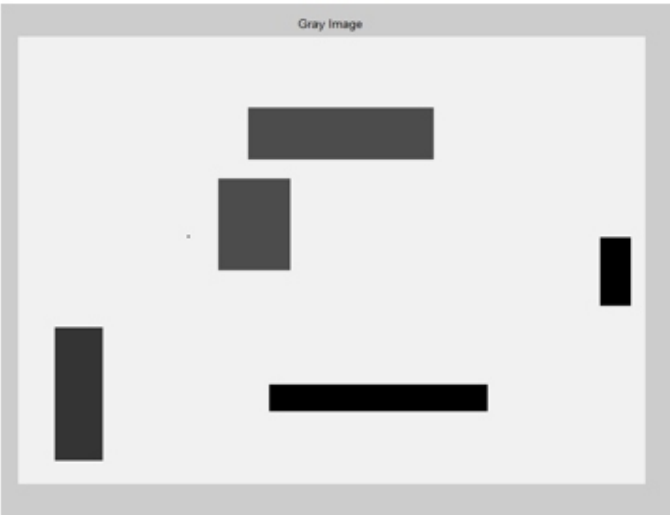

Figure 4.2 Image Matching Example with reference to similarity in shapes

5. Comparative Analysis

In this project we quote a word an efficient on the basis of the comparision we have done with following method in previous shape recognition work.

- Fourirer Descriptor method
- Minimum Boundry Circle method
- Grid Based Method
- Delauny Triangulation Method

Following points are providing comparison in terms of Efficiency of system

1. In all above method the computation time and storage requirement is very high which ultimately inrease memory requirememt in GB while in this project we required less computational time and less storage requirement with minimum memory requirement in MB.
2. Since there is no hardware requirement to bulid this project we required minimal cost to build this system.
3. Earlier prototype is build in java on sunultra workstation with 512 MB of RAM. In this project we required very less memory as compared to above to acess nearly same amount of database.
4. Since in many image matching system recall and precision system are mainly used for calculation of efficiency in this project recall and precision ration is very high since here there is presence feature matrix for indexing of number of shapes. Recall measures the ability of retrieving relevant images in a database and is defined as the ratio between the number of relevant images retrieved and the total number of relevant images in the database. While, precision measures the retrieval accuracy and is defined as the ratio between the number of relevant images retrieved and the number of total images retrieved.
5. The major drawback eliminated in our project is size of images or shapes for retrieval are increased from 192 pixel to nearly 300 pixel and even more with databsed can be acess in minimum time through cell array.

6. Conclusion

In this project I have described a generic approach for the image matching sequences. Image retrieval extraction rely on the Feature extraction that describes the different types of distorted Image in a real-time [192x144 pixels], the proposed method is applied to any real time application like detection of face of human being on Aadhar card which is distorted in terms of shape structure of human face . The Image Matching approach achieves 90% precision and recall rate with blank background, and shows acceptable robustness under the change occlusion difference in image resolution

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